

Near Detector Status & Schedule Update

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Fermilab PMG Meeting 5/25/10



NOvA Schedule Overview



Near Detector Surface Building

Near Detector Construction & Assembly Status

Near Detector Schedule

Color Code

- Information/plans
- √ Good status/completed
- → Something to watch



Near Detector Building

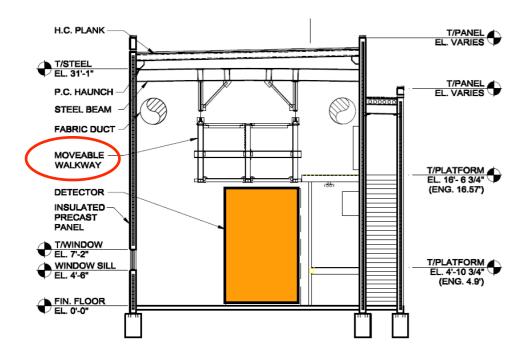


New building near MINOS service building (M.S.B.)

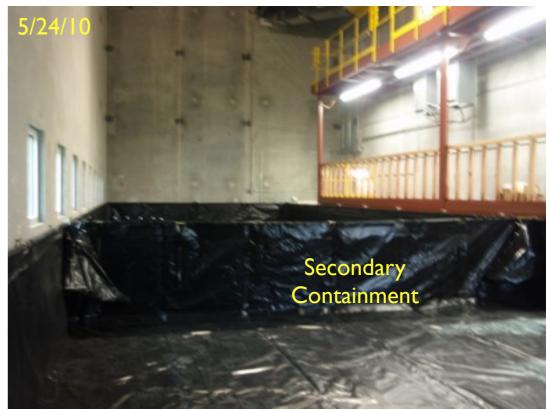
√ Construction started	12/07/09
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- √ Walls windows doors up 02/08/10
- √ Floors poured 02/19/10
- √ Complete stairways 02/25/10
- √ Power tie-in to M.S.B. 04/13/10
- √ Stationary catwalks installed 04/23/10
- √ Install secondary containment 05/19/10
- √ Ready for 1st block 05/24/10
- Movable platform installed 06/30/10

Experiment electrical work, secondary containment part of construction outfitting









Module Production



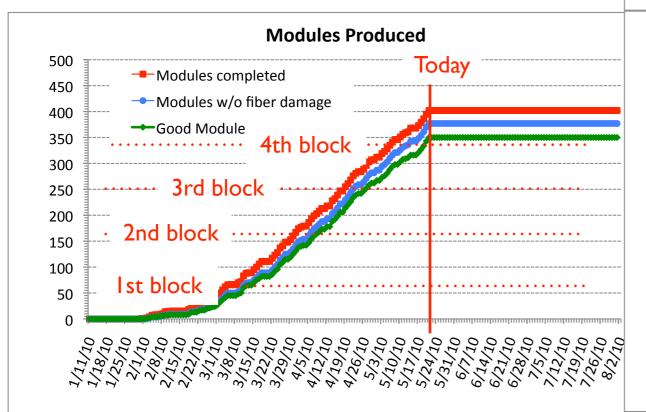
327 "good" modules produced

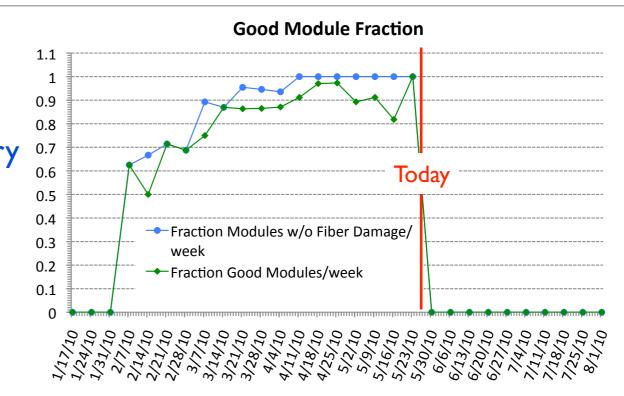
Assumptions

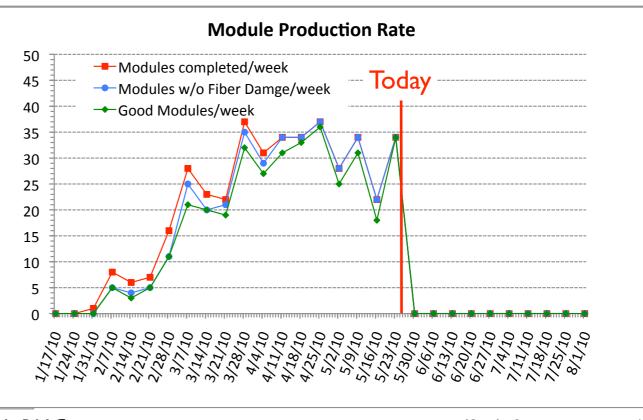
- Block = 83 modules (10% spare)
- "good" modules: no fiber damage, Factory
 QA/QC

Production Rate Analysis (RJT)

- Rate, 8 wk avg (29/wk, "good")
- 4 blocks of modules (332) 5/24/10
- 5 blocks of modules (415) 6/14/10









Near Detector Assembly



Near Detector Schematic



5 Block "SuperBlock"

Prototype near detector block(31 planes)

- √ Glued prototype assembly completed 2/11/10
- ✓ Arrived in MINOS service building 3/16/10
- √ Assembly rate ~ Ihr/plane (2-3 modules/plane)

Near Detector block assembly

- ✓ 1st detector block completed (4/7/10)
- √ Leak tests and fiber test for all modules in block at ANL
- Need to paint production blocks black

Muon Catcher Design

- ✓ Engineering complete (4/29/10)
- ✓ Steel plates ordered (4/1/10)
- Parts for support structure not yet ordered





Scintillator



Minearal Oil

✓ PO for all NOvA mineral oil(~3,000,000 gal)

Waveshifting Powders

✓ All powders in hand for detector scintillator (5/21/10, for both near and far detector)

Blend scintillator for Near Detector

- Need ~30,000 gallons for Near Detector
- ✓ Mineral oil supplier selected PR in procurement
- ✓ 60,000 gallons + options for full 3,000,000 gallons
- ✓ Selected 2 toll blenders to blend 30,000 gallons each (5/7/10)
- √ Pseudocumene for Near Detector in hand
- Blend in early June

Blend scintillator at FNAL for vertical slice 5 (full size module)

- ✓ Filtered fluor blend made into scintillator (5/19/10)
- Scintillator at IU for tests

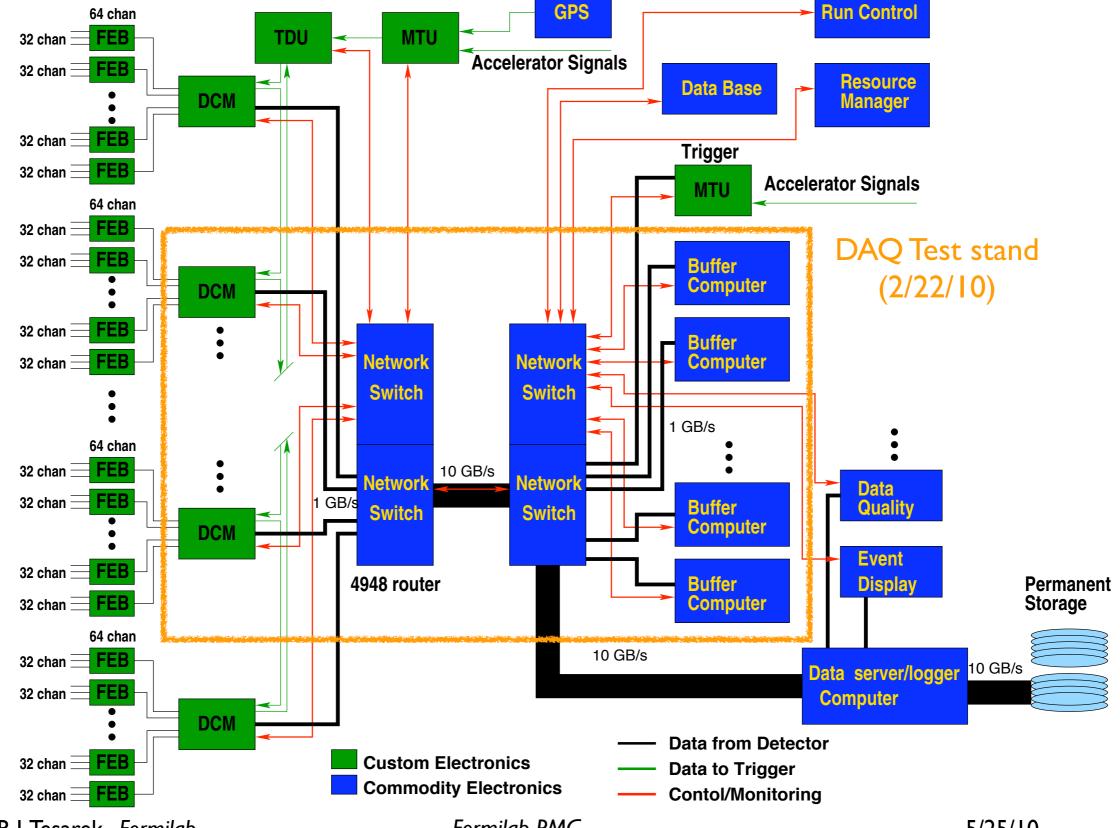
Near Detector scintillator distribution system (J.Musser, W.Fox, D.Pushka)

- Engineering design complete
- Begin procuring parts



NOvA Electronics/DAQ Overview







Electronics



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Avalanche Photo Diodes (APDs)

- √ First 20 APDs arrived (3/11/10)
- ✓ Dark currents very low (agree with Hamamatsu measurements)
- ➡Production APD delivery 7/29/10
- → 4 block milestone delayed!

Front End Board (FEB) v4

- √ PCB fabrication began(3/5/10)
- √ 5 FEBs in hand (4/1/10)
- √ FEB/DCM communication tests (April)
- Production quantities begin arriving in June

Data Concentrator Modules(DCM)

- ✓ Prototype DCM (4) in DAQ test stand
- Expect DCMs for the near detector this week (5/25/10)
- Problems with DCM connectors (temporary solution identified)

Time Distribution Units (TDU)

- √ 2 boards stuffed, checked and booting
- √ TDU Daughter boards boot(5/24/10)
- Firmware development/tests underway
- Expect TDUs for the near detector in late June, early July
- FEB-DCM-TDU tests begin in mid July

DAQ/Networking/Computers

- √ All DAQ computers in hand
- Install software in Control Room computers (early June)

Power Distribution

- √ HV/LV power supplies ordered (3/5/10)
- ✓ Prototype Power Dist. Board (3/15/10)
- Boards in production
- PDB ready for installation end of May



DAQ Software



NOvA Control Room 5/24/10

Significant replanning of tasks (P.Shanahan)

- √ Re-planning completed
- DAQ schedule completes "just in time" for IPND milestone

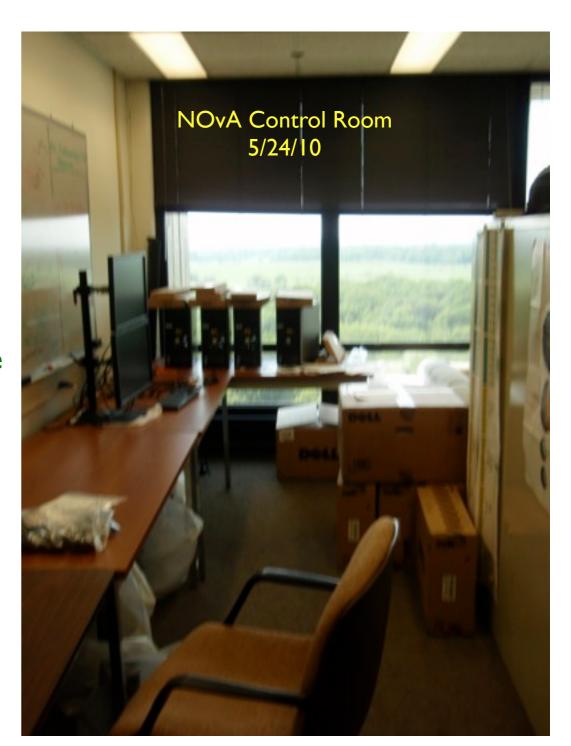
Software

- √ DAQ specifications complete
- ✓ Software framework/external software packages complete
- √ Event structure/event building emulation complete
- ✓ Run Control State model defined
- √ Send simulated data from DCM to buffer nodes
- Simulated data complete chain test I DCM to I buffer node to data logger(mid May)
- Real data complete chain test multiple DCM to multiple buffer nodes to data logger (end May)

Control Room

Detector controls

"No progress", needs advocate





Near Detector Score Card



Item	Qty needed	Qty in-hand	Units	Fraction (%)			
Detector Modules	497+spare	327		65.8			
Detector Blocks	6.5	I		15.4			
APDs	550	20		3.6			
FEBs	550	5		0.9			
DCMs	16	16		100.0			
TDUs	4	2		50.0			
HV supplies	3	0		0.0			
LV supplies	7	7		100.0			
Power Distribution Boxes	14	(I) ¹		0.0			
Power Distribution Cards	240	(20)1		0.0			
Scintillator	30,300	(4,500)	gallons	0.0			
Buffer Computers	16	16		100.0			
Network Switches	2	2		100.0			
Control Room Computers	5	5		100.0			
Special Purpose Computers	4	4		100.0			

Quantities for near detector + spares

¹ prototype components



Near Detector Schedule



* Activitie		# Bondanas -	Francisco de Francis	Francisco Sect	hub. 2000	August 200	Cantambas	October 35	Managhan	Daramhar 3	Innune 201	Eshauar 2	March 2010	April 2010	May 2010	hunn 2010				IITI Q-	Ostober 30	November
# Info	Title	# Predecessors	Expected Start	Expected End	July 2009 July	-	September			December 2			March 2010	April 2010	May 2010	June 2010 June	July 20		gust 201 August	September		
0000	▼ E TesarekNDOS_Schedule-Draft100519		11/1/09	11/22/10	20.7		Schedule-Dra				,			- 4		2011		-		3-4		
10	► CY10 Accelerator Shutdown		7/19/10	8/27/10											CY10 A	ccelerator Shute	own (L5 month	15			1
5	► APD Production		3/11/10	9/3/10							A	PD Production	6.35 mor	oths								
16	► APD Testing		8/6/10	9/24/10													APD Test	ing [I	8 menth	hs.		
23	► DCM/TDU		2/5/10	8/17/10							DCM/TDU	6.9 month	5						_ c	GS.2.; G.S.1.		
46 @	> FE8-v4		3/5/10	7/19/10								FEB-v4	4.85 month	15								
58 @	► Power Distribution		3/5/10	6/4/10							Power 0	distribution	3.3 months									
76 ©	► DAQ software		2/19/10	7/8/10							DAQ soft	ware 5 m	onths.									
88	► Modules		1/11/10	7/14/10						Module		nths										
98	► Block Assembly		11/2/09	8/26/10			Block	Assembly	10.7 months													
17	► ND Building		11/2/09	5/19/10			,	D Building	7.15 months													
25	► Movable Access Platform		11/6/09	6/21/10			Movable Ac	ess Platform	8.1 month													
30	► General Infrastructure Installation		5/20/10	6/8/10									eneral Infrast	ructure Install	ation 2.6	lw						
41 @	► Detector Installation		5/31/10	8/27/10										Detector In	nstallation	3.25 months		-				
51	► ND Scintillator Production		6/2/10	6/23/10									N	D Scintillator	Production	3.2w						
74	► Detector Outfitting		6/22/10	9/27/10											Detector O	vefitting [3.5	months					
23	IPND (4 blocks) installed	145	7/9/10	7/9/10											IPND (4 b)	locks) installed	0					
24	IPND instrumented, ready to take data	217; 220	9/3/10	9/3/10												PND instrume	nted, rea	dy to tak	e data	O-		
25 @	Near Detector ready to take data	221; 222; 224	9/27/10	9/27/10													Near D	Actector r	eady to t	take data. 🛶		
26	► FHEP		5/4/10	11/22/10										FHEP	7.25 mont	ths ?						
33	► Vert Slice 5		11/2/09	6/7/10				Vert Slice S	7.8 months													

Today CY10 Shutdown

Aggressive schedule to maximize data w/ near detector

- First block active mid August
- IPND(4 blocks) ready to take data 9/3/10 (-39 days float for milestone)
- Working with Hamamatsu to advance delivery of APDs
- Full Detector ready to take data 3 weeks after IPND milestone

NOTE: Scintillator production is *NOT* in the schedule



Overview of Major Milestones



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My projections based on input from managers

Near Detector Surface Building ready for near detector	5/19/10
332 modules complete (4 blocks + spares)	5/24/10
I st detector block installed	6/04/10
4 th detector block complete	7/08/10
4 th detector block installed	7/09/10
Ist detector block filled with scintillator	7/14/10
All detector modules complete	7/14/10
1st detector block w/ instrumentation (~20 modules)	7/21/10
4 th detector block filled with scintillator	8/03/10
Ist detector block fully instrumented	8/12/10
100 APDs arrive for testing	8/06/10
6 th detector block installed	8/20/10
Muon catcher installed	8/27/10
4 th detector block ready to take data (IPND)	9/03/10
Muon catcher filled with scintillator	9/13/10
Near detector ready to take data	9/27/10



Summary



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Considerable progress for Near Detector since Jan. collaboration meeting

- √ New near detector building is complete
- √ All near detector extrusions in hand
- √ All near detector WLS fiber in hand
- √ >327 modules produced of both types(H-thin wall, V-thick wall)
- √ 246 modules at ANL (~80 for block assembly)
- √ Ist near detector block complete
- √ FEB production prototypes under test
- ✓ DCM/Buffer computer test stand for software development

What to watch

- → APD delivery/testing schedule
- Electronics delivery/testing schedule
- Detector controls (slow monitoring)
- → Muon Catcher procurement/assembly

Other progress

• Most FHEP block pivoter parts in hand (waiting for component lifting fixtures)